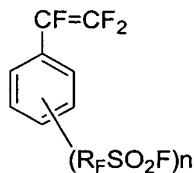


Amendments to Claims

What is claimed is:

1. (Original) A monomer having the following structure:

5



1

wherein R_F is linear or branched perfluoroalkene group, optionally

10 containing oxygen or chlorine; and

n is 1 or 2.

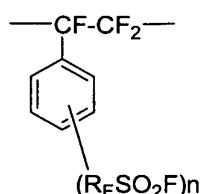
2. (Currently Amended) The monomer of claim 1 wherein R_F is selected from the group consisting of (CF₂)_r wherein r = 1 to 20,

(CF₂CF₂)_rOCF₂CF₂ wherein r = 0 to 6, and (CF(CF₃)O)_rCF₂CF₂ wherein r = 1 to 8.

15 3. (Currently Amended) The monomer of claim 2 wherein R_F is selected from the group consisting of (CF₂)_r wherein r = 1 to 8, (CF₂CF₂)_rOCF₂CF₂ wherein r = 0 to 2, and (CF(CF₃)O)_rCF₂CF₂ wherein r = 1 to 2.

20 4. (Original) The monomer of claim 1 wherein n is 1.

5. (Original) A homopolymer having the following structure:



2

wherein R_F is linear or branched perfluoroalkene group, optionally

25 containing oxygen or chlorine,

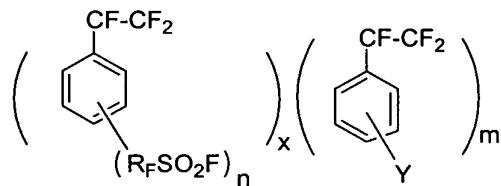
n is 1 or 2.

6. (Currently Amended) The homopolymer of claim 5 wherein R_F is selected from the group consisting of (CF₂)_r wherein r = 1 to 20, (CF₂CF₂)_rOCF₂CF₂ wherein r = 0 to 6, and (CF(CF₃)O)_rCF₂CF₂ wherein r = 1 to 8.

5 7. (Currently Amended) The homopolymer of claim 6 wherein R_F is selected from the group consisting of (CF₂)_r wherein r = 1 to 8, (CF₂CF₂)_rOCF₂CF₂ wherein r = 0 to 2, and (CF(CF₃)O)_rCF₂CF₂ wherein r = 1 to 2.

8. (Original) The homopolymer of claim 1 wherein n is 1.

10 9. (Original) A copolymer selected from the group consisting of:
(a) a copolymer having the structure:



3

wherein R_F is linear or branched perfluoroalkene group, optionally

15 containing oxygen or chlorine,

Y is H; halogen such as Cl, Br, F or I; linear or branched perfluoroalkyl groups, wherein the alkyl group comprises C1 to C10 carbon atoms; or a perfluoroalkyl group containing oxygen, chlorine or bromine, and wherein the alkyl group comprises C1 to C10 carbon atoms,

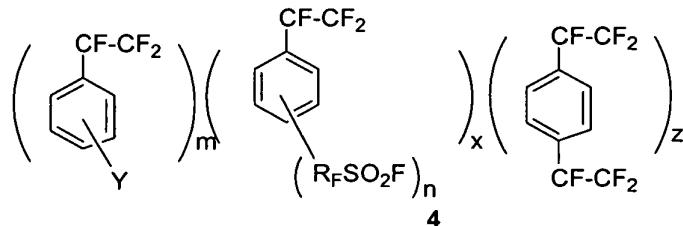
20 n is 1 or 2,

m and x are mole fractions wherein m is 0.01 to 0.99 and x is 0.99 to 0.01; and

x+m = 1

(b) a copolymer having the structure:

25



wherein R_F is linear or branched perfluoroalkene group, optionally containing oxygen or chlorine,

Y is H; halogen such as Cl, Br, F or I; linear or branched perfluoroalkyl groups, wherein the alkyl group comprises C1 to C10 carbon atoms; or a perfluoroalkyl group containing oxygen, chlorine or bromine, and wherein the alkyl group comprises C1 to C10 carbon atoms,

n is 1 or 2,

m, x and z are mole fractions wherein m is 0.01 to 0.99,

x is 0.99 to 0.01, and

10 z is 0.0001 to 0.10

m + x + z = 1.

10. (Currently Amended) The copolymer of claim 9 wherein R_F is selected from the group consisting of (CF₂)_r wherein r = 1 to 20,

(CF₂CF₂)_rOCF₂CF₂ wherein r = 0 to 6, and (CF(CF₃)O)_rCF₂CF₂ wherein r =

15 1 to 8.

11. (Original) The copolymer of claim 10 wherein R_F is selected from the group consisting of (CF₂)_r wherein r = 1 to 8, (CF₂CF₂)_rOCF₂CF₂ wherein r = 0 to 2, and CF(CF₃)O_rCF₂CF₂ wherein r = 1 to 2.

12. (Currently Amended) The copolymer of claim 9 wherein the linear or branched perfluoroalkyl and non-fluorinated alkyl groups, wherein the alkyl group comprises C1 to C10 carbon atoms is selected from the group consisting of C_nF_{2n+1}, wherein n is 1 to 10; and C_nH_{2n+1}, wherein n is 1 to 10.

13. (Original) The copolymer of claim 9 wherein the perfluoroalkyl group containing oxygen, chlorine or bromine, and wherein the alkyl group comprises C1 to C10 carbon atoms is selected from the group consisting of CF₃(CF₂)_qO(CF₂CF₂)_q wherein q = 1 to 5 and CF₃CF₂CF₂(OCFCF₃)_q wherein q = 1 to 5.

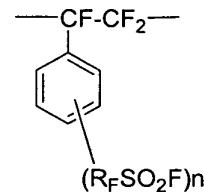
14. (Original) The copolymer of claim 13 wherein the perfluoroalkyl group containing oxygen, chlorine or bromine is selected from the group consisting of CF₃(CF₂)_qOCF₂CF₂ wherein q = 1 to 2, and CF₃CF₂CF₂(OCFCF₃)_q wherein q = 1 to 3.

15. (Original) The copolymer of claim 14 wherein n is 1.

16. (Original) The copolymer of claim 9 wherein m and x are mole fractions, wherein m is 0.1 to 0.4; and x is 0.9 to 0.6 in structure 3.

17. (Original) The copolymer of claim 9 wherein m, x and z are mole fractions, wherein m is 0.2 to 0.6; x is 0.4 to 0.8; and z is 0.002 to 0.01 in structure 4.

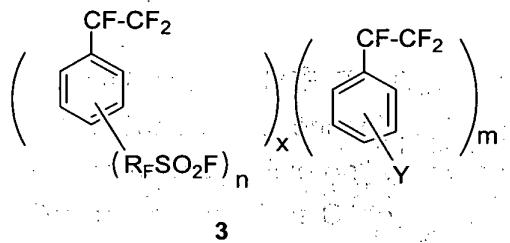
18. (Original) A polymer electrolyte membrane prepared from a homopolymer or copolymer selected from the group consisting of:
(a) a homopolymer having the structure:



2

5 wherein R_F is linear or branched perfluoroalkene group, optionally containing oxygen or chlorine,
n is 1 or 2;

(b) a copolymer having the structure:



3

10 wherein R_F is linear or branched perfluoroalkene group, optionally containing oxygen or chlorine,

Y is H; halogen such as Cl, Br, F or I; linear or branched perfluoroalkyl groups, wherein the alkyl group comprises C1 to C10 carbon atoms; or a perfluoroalkyl group containing oxygen, chlorine or bromine, and wherein the alkyl group comprises C1 to C10 carbon atoms,

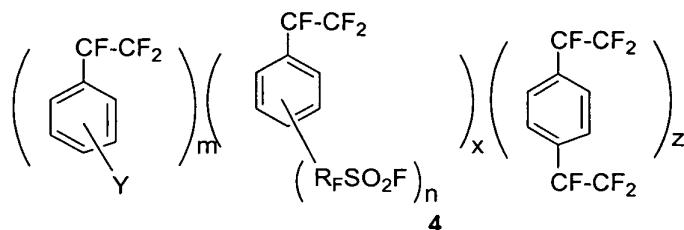
15 n is 1 or 2,

m and x are mole fraction wherein m is 0.01 to 0.99 and

x is 0.99 to 0.01; and

20 x+m = 1; and

(c) a copolymer having the structure:



wherein R_F is linear or branched perfluoroalkene group, optionally containing oxygen or chlorine,

Y is H; halogen such as Cl, Br, F or I; linear or branched

5 perfluoroalkyl groups, wherein the alkyl group comprises C1 to C10 carbon atoms; or a perfluoroalkyl group containing oxygen, chlorine or bromine, and wherein the alkyl group comprises C1 to C10 carbon atoms,

n is 1 or 2,

m , x and z are mole fraction wherein m is 0.01 to 0.99,

10 x is 0.99 to 0.01, and

z is 0.0001 to 0.10

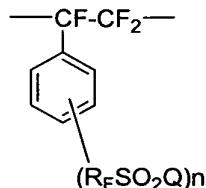
$m + x + z = 1$; and mixtures thereof.

19. (Original) The polymer electrolyte membrane of claim 18 further comprising a porous support.

15 20. - 30. (Canceled)

31. (Original) A polymer electrolyte membrane selected from the group consisting of:

(a) a membrane having the chemical structure:



5

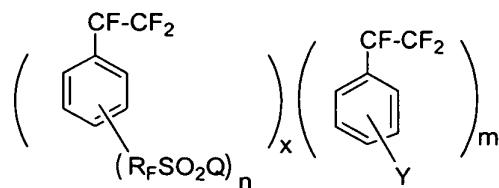
20 wherein R_F is linear or branched perfluoroalkene group, optionally containing oxygen or chlorine,

$Q = \text{OM, OH, NHSO}_2\text{R}_F$, wherein $M = \text{Li}^+, \text{Na, K or Cs}$,

$n = 1$ or 2;

(b) a membrane having the chemical structure:

25



wherein R_F is linear or branched perfluoroalkene group, optionally containing oxygen or chlorine,

Y is H; halogen such as Cl, Br, F or I; linear or branched perfluoroalkyl groups, wherein the alkyl group comprises C1 to C10 carbon atoms; or a perfluoroalkyl group containing oxygen, chlorine or bromine, and wherein the alkyl group comprises C1 to C10 carbon atoms,

$Q = OM, OH, NH_2SO_2R_F$, wherein $M = Li^+, Na^+, K^+$ or Cs^+ ,

n is 1 or 2,

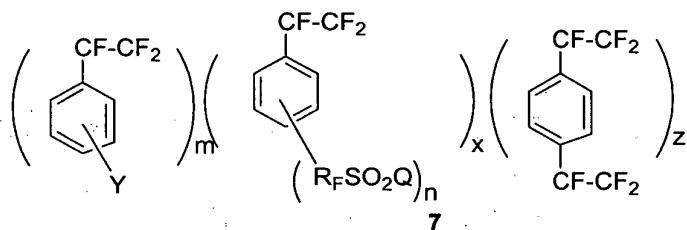
10 m and x are mole fractions wherein m is 0 to 0.99,

x is 1 to 0.001, and

$x + m = 1$; and

(c) a membrane having the chemical structure:

15



wherein R_F is linear or branched perfluoroalkene group, optionally containing oxygen or chlorine,

Y is H; halogen such as Cl, Br, F or I; linear or branched perfluoroalkyl groups, wherein the alkyl group comprises C1 to C10 carbon atoms; or a perfluoroalkyl group containing oxygen, chlorine or bromine, and wherein the alkyl group comprises C1 to C10 carbon atoms,

$Q = OM, OH, NH_2SO_2R_F$, wherein $M = Li^+, Na^+, K^+$ or Cs^+ ,

n is 1 or 2,

25 m, x and z are mole fractions wherein m is 0.01 to 0.99 ,

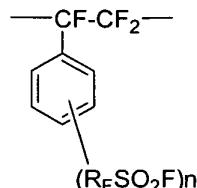
x is 0.99 to 0.01,

z is 0.0001 to 0.10, and

$m + x + z = 1$

32. (Original) A membrane electrode assembly comprising a polymer electrolyte membrane, having a first surface and a second surface, wherein the membrane is prepared from a homopolymer or copolymer selected from the group consisting of:

(a) a homopolymer having the structure:

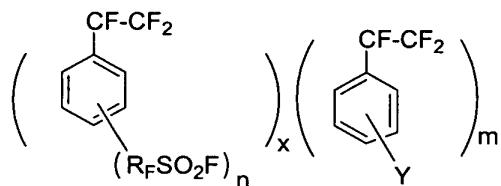


2

wherein R_F is linear or branched perfluoroalkene group, optionally containing oxygen or chlorine,

5 n is 1 or 2;

(b) a copolymer having the structure:



3

wherein R_F is linear or branched perfluoroalkene group, optionally containing oxygen or chlorine,

10 Y is H; halogen such as Cl, Br, F or I; linear or branched perfluoroalkyl groups, wherein the alkyl group comprises C1 to C10 carbon atoms; or a perfluoroalkyl group containing oxygen, chlorine or bromine, and wherein the alkyl group comprises C1 to C10 carbon atoms,

15 n is 1 or 2;

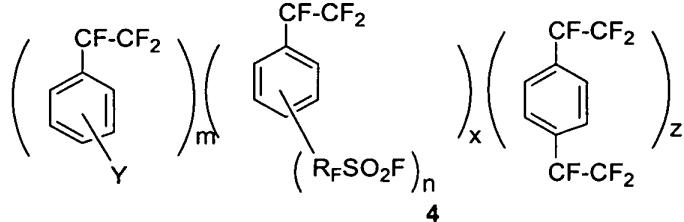
m and x are mole fractions wherein m is 0.01 to 0.99,

x is 0.99 to 0.01; and

x+m = 1; and

(c) a copolymer having the structure:

20



4

wherein R_F is linear or branched perfluoroalkene group, optionally containing oxygen or chlorine,

Y is H; halogen such as Cl, Br, F or I; linear or branched perfluoroalkyl groups, wherein the alkyl group comprises C1 to C10 carbon atoms;

5 or a perfluoroalkyl group containing oxygen, chlorine or bromine, and wherein the alkyl group comprises C1 to C10 carbon atoms,

n is 1 or 2,

m, x and z are mole fractions wherein m is 0.01 to 0.99,

x is 0.99 to 0.01, and

10 z is 0.0001 to 0.10

m + x + z = 1; and mixtures thereof.

33. (Canceled)

34. (Original) The membrane electrode assembly of claim 32 further comprising at least one electrode prepared from an electrocatalyst coating composition present on the first and second surfaces of the membrane.

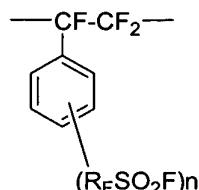
15 35. (Original) The membrane electrode assembly of claim 34 further comprising at least one gas diffusion backing present on the at least one electrode on the side away from the polymer electrolyte membrane.

36. (Original) The membrane electrode assembly of claim 32 further comprising a gas diffusion electrode present on the first and second surfaces of the membrane, wherein the gas diffusion electrode comprises a gas diffusion backing and an electrode prepared from an electrocatalyst containing composition.

37. – 47. (Canceled)

25 48. (Original) A electrochemical cell comprising a membrane electrode assembly, wherein the membrane electrode assembly comprises a polymer electrolyte membrane, having a first surface and a second surface, wherein the membrane is prepared from a homopolymer or copolymer selected from the group consisting of:

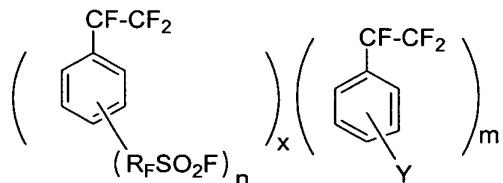
30 (a) a homopolymer having the structure:



wherein R_F is linear or branched perfluoroalkene group, optionally containing oxygen or chlorine,

n is 1 or 2;

5 (b) a copolymer having the structure:



3

wherein R_F is linear or branched perfluoroalkene group, optionally

10 containing oxygen or chlorine,

Y is H; halogen such as Cl, Br, F or I; linear or branched perfluoroalkyl groups, wherein the alkyl group comprises C1 to C10 carbon atoms; or a perfluoroalkyl group containing oxygen, chlorine or bromine, and wherein the alkyl group comprises C1 to C10 carbon atoms,

15 n is 1 or 2,

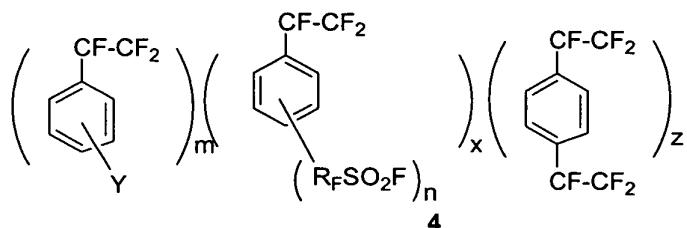
m and x are mole fractions wherein m is 0.01 to 0.99,

x is 0.99 to 0.01,

x+m = 1, and

(c) a copolymer having the structure:

20



wherein R_F is linear or branched perfluoroalkene group, optionally containing oxygen or chlorine,

Y is H; halogen such as Cl, Br, F or I; linear or branched

25 perfluoroalkyl groups, wherein the alkyl group comprises C1 to C10 carbon atoms; or a perfluoroalkyl group containing oxygen, chlorine or bromine, and wherein the alkyl group comprises C1 to C10 carbon atoms,

n is 1 or 2,
m, x and z are mole fractions wherein m is 0.01 to 0.99,
x is 0.99 to 0.01,
z is 0.0001 to 0.10, and
5 $m + x + z = 1$; and mixtures thereof.

49. (Original) The electrochemical cell of claim 48 wherein the electrochemical cell is a fuel cell.

50.- 58. (Canceled)